burnays, and soap-boilers, one of whose spiracles alone does manifestly infect the air more than all the chimneys of London put together. Whilst these are belching from their sooty jaws, the city of London resembles the face rather of Mount Etna, or the suburbs of hell, than an assemblage of rational creatures, and the imperial seat of our incomparable monarch. These foul-mouthed issues, and curls of smoke do draw a sable curtain over heaven. The columns and clouds belched forth are so thick and plentiful, and rushing out with great impetuosity, they are capable of resisting the fiercest winds, and fall down upon the houses before they can be dissipated; so as two or three of these fumid vortices are able to whirl it about the whole city, rendering it in a few moments like the picture of Troy sacked by the Greeks, or the approaches of Mount Hecla. When the air in all other places is serene and pure, it is here eclipsed with such a cloud of sulphur that the sun itself, which gives day to all the world besides, is hardly able to penetrate and impart it to London; and the weary traveller at many miles' distance sooner smells than sees the city to which he repairs. It is that pernicious smoke which superinduces a sooty crust or fur upon all that it touches, spoiling the moveables, tarnishing the plate, gilding, and furniture, and corroding the very iron bars and stones. It is this horrid smoke which obscures our churches, and makes our palaces look old. How it sticks on the hands and faces and linen of our fair ladies and nicer dames who reside constantly in London, especially during winter, the prodigious waste of almond powder for the one, and soap and wearing out the other, do sufficiently manifest. It scatters and strews about those black and smutty atoms upon all things where it comes, insinuating itself into our very secret cabinets and most precious repositories, which diffuses and spreads a yellowness upon our choicest pictures and hangings; is avernus to fowl, and kills our bees and flowers, abroad suffering nothing to bud, display themselves, or ripen. The air of London is never clear of this smoke, which is a plague so many other ways, and indeed intolerable, because it kills not all at once, but always; for is there under heaven such coughing and snuffing as in the London churches and assemblies of people, where the barking and spitting is most incessant and unfortunate; and what may be the cause but the inspiration of this infernal vapour?

Shade of Evelyn! with what satisfaction must thou regard the lofty growth of the "spiracles" of these our days; but much more so, the pains and penalties now suspended over the heads of refractory brewers and soap-boilers.

SMOKE is the compound body arising from the combustion of substances; and it is the presence of carbonaceous matters that renders it opaque and visible. Were it not for these dark particles of unconsumed carbon, the products properly composing it—carbonic-acid and nitrogen—would be insensible to the sight. An analysis of London blacks or smuts, by Mr. Solly, jun., gave as follows:—

Salts of ammonia	426
Combustible matter	371
Silica	65
Oxide of iron	50
Alumina	31
Sulphate of lime	31
Salts of potash and soda	24
Carbonate of magnesia	2
	1,000

Imperfect combustion, from which thus proceeds opaque smoke, is commonly caused by the forcing the furnace to consume a greater quantity of fuel than it is calculated for; the object being the evaporation of the greatest possible quantity of water. The maximum of effect is obtained by certain ascertained relations amongst the parts of the furnace, the combustion, and boiler, a departure from which produces waste: these circumstances we shall briefly and severally point out.

The nature of the fuel—its kind and quality—are necessary to be well understood. The kinds employed may be classified as the anthracite, the bituminous, and the splint and Cannel coals. *Anthracite coal* is of a peculiarly hard, tenacious, and stubborn nature, requiring that it should be broken up into minute pieces, and largely, and even forcibly, supplied with oxygen, to procure the volatilisation of its products: this fuel, being smokeless, we have hardly to do with in this inquiry, beyond recognition. *Bituminous coal*, that which is most commonly used, is of a more friable nature, splitting up into fragments, as its gaseous components are evolved in combustion: in this process, a certain quantity of atmospheric air is essential. *Splint* and *slaty coal* burn more freely, and require less air than the preceding.

The air required for perfect combustion is not simply such as passes up between the bars of the fire-grate; but the efficacy of admitting a supply beyond, at the bridge, over which the flames pass into the flue, has been established; it being there prepared to admix advantageously with the uninflamed carbonaceous gases, rendering them capable of combustion on passing in contact over the more incandescent fuel on the rear portion of the grate. The quantity of air necessary, with bituminous coal, is found to be as much as ten times the volume of the gases; but as it will vary with the quality of the fuel, and the effect of supplying more than a sufficiency is an additional consumption of the latter—to make up for loss of heat, the apertures, in the first place ample in capacity, should be constructed so as to admit of regulation, till a close approximate to the maximum effect is obtained. This largeness of supply is owing to the fact of the presence, with the oxygen, of twice its volume of nitrogen, a gas which is neither combustible, nor an agent of combustion, and not being conveniently separable, is just so much worse-than-useless matter, the passage of which has to be provided for.

Fuel of the caking description is liable, by the vitrifying of its earthy particles, and forming clinkers on the top of the grate-bars, to close the openings between these, and thus prevent the admission of a portion of the air necessary for its combustion: with such fuel it is obvious the openings near the bridge are especially of importance.*

ON POLYCHROMATIC EMBELLISHMENTS IN GREEK ARCHITECTURE.

AT a meeting of the Institute of British Architects, on the 12th, Professor Donaldson gave an explanation of the system, as illustrated in the recent work "On the Polychromy of the Ancients," by M. Hittorff. He commenced his remarks by a tribute to the liberality of the foreign correspondents of the Institute, who, in the valuable works they presented to the Library, set a noble example to the members generally. The subject of Polychromy had occupied attention for more than thirty years. Even Stuart had intimated that some portions of the edifices of Athens, carved and uncarved, were embellished by colour; but this fact was only considered generally, and not as a principle in the architecture of the Greeks. About the year 1830, M. Hittorff read a paper on the subject before the Institute of France, which was published in the annals of the Archæological Institute of Rome. That gentleman had been so much struck with the results of his observation of the remarkable ancient monuments of Sicily, as to arrive at the conclusion that it was necessary, for the full effect of these works, that the whole of the buildings should be painted. This principle, broadly and unreservedly advanced, was attacked by M. Raoul Rochette, then Professor of Archæology at Paris, a learned archæologist, but neither an architect nor an artist. In two articles on mural painting among the Greeks, M. Rochette endeavoured to prove that these works were executed simply on tablets, and not upon the walls of the temples. The subject then seemed to slumber, though M. Hittorff and others continued their investigations. He (Mr. Donaldson) had himself been quoted by many authors, as the first to observe that the walls of the Theseum at Athens had been worked with a point, to receive a coating of plaster or stucco, enabling the whole surface to be painted. He had, in fact, brought to this country fragments from the Parthenon, the Propylæa, and the Theseum, which, on being analysed by Professor Faraday, gave ample evidence that painting did exist on these buildings, and showed what materials were employed for that purpose. The subject was forcibly brought before the attention of learned Europe by an important series of illustrations, published in Germany, by a gentleman then present, Herr Semper, some of whose drawings were displayed upon the walls of the room. Among these were restorations of a part of the Parthenon, a building at Pompeii, an Etruscan tomb, and a representation of the remains of colour visible on the Temple of Theseus. Mr. Donaldson also referred to a restoration of the façade of the Parthenon by Mr. Owen Jones, which he characterised as more ideal than that of Herr Semper, although displaying much study and ability. The work of Semper (in 1834) was followed in 1835 by another from the pen of Dr. Franz Kugler, "On the Polychromy and Sculpture of the Greeks, and its limits." The latter branch of the question was a most important one, for the restorations of both Hittorff and Semper were unlimited in their application of colour, and he believed the meeting would be disposed to concur with them. Following, however, in the steps of M. Raoul Rochette, Dr. Kugler was of opinion that polychromy in ancient art was limited in its application.

The Institute of British Architects had appointed a committee to examine the traces of colour on the Elgin marbles, and the results of their researches, and the accompanying analyses of Mr. Faraday, were not only important in themselves, but agreed with those arising from similar investigations, subsequently undertaken by scientific men at Athens.

Proceeding to notice M. Hittorff's work, Mr. Donaldson explained that the first part of it took a general view of polychromy, considered historically, and the second part discussed it practically. It appeared that M. Hittorff had especially directed his attention to the remains of the small tetrastyle temple of Empedocles, at Selinus, in Sicily, which edifice he had restored, with polychromatic decorations throughout. his illustrations of that building being exhibited and referred to by Mr. Donaldson. The plan of this temple showed a portico of four columns in front, and behind them the walls of the pronaos and cella, measuring only 20 feet by 16. It appeared, from the porous nature of the stone, that it required to be covered with stucco, and M. Hittorff, from his examination of the fragments, came to the conclusion that the whole building so stuccoed was elaborately covered with painting. The floor, or pavement, of the cella and pronaos was represented in the drawing as executed in mosaic work. There was, however, no such mosaic work found, but, on the contrary, there were traces of a floor of plaster. M. Hittorff found, by researches in other temples, an instance of a floor of painted stucco, and such floors were also found at Pompeii, Rome, and Olympia. The author accordingly restored the pavement of the Temple of Selinus in painted stucco, adopting forms and patterns similar to those of ancient mosaic floors. M. Hittorff, in conjunction with M. Zanth, his fellow traveller, found some fragments of a fluted shaft on the site of the temple, with portions of a Doric entablature and an Ionic capital, and formed their restoration of the building by a combination of these discoveries. This combination of the parts of two orders was not uncommon in Sicily, Magna Græcia, and the East. At Agrigentum the tomb of Theron had a Doric entablature, while the capital of the columns was Ionic. In the remains at Pæstum, in the tomb of Absolom, near Jerusalem, and in the remarkable buildings at Petra, similar instances were to be found; while the arch at Aosta, near Turin, presented even a Corinthian capital supporting a Doric entablature. Some of these examples were of later epochs, but there was more than one such example furnished by the truly classic period of ancient art. M. Hittorff also adverted in his work to many examples of the same practice, as being represented on the vases of the ancients. It was also shown on some frescoes at Pompeii. M. Raoul Rochette, ignorant of this admixture of two orders, objected on that ground to M. Hittorff's restoration; but it was evident, from the instances referred to, that the ancients did not confine

* To be continued.

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